

## Claims

- [c1] 1. An apparatus for railcar data acquisition and communication, said apparatus comprising:  
a data acquisition module adapted for acquiring railcar data from a railcar and generating acquired data; and  
an electronic transmitter adapted for receiving said acquired data, deriving transmitted data from said acquired data, and transmitting said transmitted data.
- [c2] 2. The apparatus of claim 1 wherein said electronic transmitter is further adapted for wirelessly transmitting said transmitted data.
- [c3] 3. The apparatus of claim 1 wherein said data acquisition module comprises a single-wire interface adapted for converting single-wire data to said acquired data.
- [c4] 4. The apparatus of claim 3 wherein said data acquisition module further comprises a single-wire identification device adapted for converting identification data to said single-wire data.
- [c5] 5. The apparatus of claim 3 wherein said data acquisition module further comprises a single-wire thermometer adapted for measuring a temperature of said railcar and converting said temperature to said single-wire data.
- [c6] 6. The apparatus of claim 3 wherein said data acquisition module further comprises:  
a single-wire counter adapted for counting data pulses to yield a data pulse count and converting said data pulse count to said single-wire data; and  
a wheel shaft encoder adapted for generating said data pulses as a function of revolutions of a wheel of said railcar.
- [c7] 7. The apparatus of claim 3 wherein said data acquisition module further comprises a single-wire analog interface adapted for converting an analog sensor signal from an analog sensor to said single-wire data.
- [c8] 8. The apparatus of claim 7 wherein said analog sensor is selected from a group

consisting of load cells, vibration sensors, level sensors, pressure sensors, and humidity sensors.

- [c9] 9. The apparatus of claim 1 further comprising a touch pad interface adapted for communicating said acquired data to an external touch pad.
- [c10] 10. The apparatus of claim 9 wherein said touch pad interface is further adapted for receiving touch pad data from a second external touch pad.
- [c11] 11. A system comprising:  
a railcar;  
a data acquisition module adapted for acquiring railcar data from said railcar and generating acquired data; and  
an electronic transmitter adapted for receiving said acquired data, deriving transmitted data from said acquired data, and transmitting said transmitted data,  
said electronic transmitter being further adapted for wirelessly transmitting said transmitted data,  
said data acquisition module comprising a single-wire interface adapted for converting single-wire data to said acquired data.
- [c12] 12. The system of claim 11 wherein said data acquisition module further comprises a single-wire identification device adapted for converting identification data to said single-wire data.
- [c13] 13. The system of claim 11 wherein said data acquisition module further comprises a single-wire thermometer adapted for measuring a temperature of said railcar and converting said temperature to said single-wire data.
- [c14] 14. The system of claim 11 wherein said data acquisition module further comprises:  
a single-wire counter adapted for counting data pulses to yield a data pulse count and converting said data pulse count to said single-wire data; and  
a wheel shaft encoder adapted for generating said data pulses as a function of revolutions of a wheel of said railcar.

- [c15] 15. The system of claim 11 wherein said data acquisition module further comprises a single-wire analog interface adapted for converting an analog sensor signal from an analog sensor to said single-wire data.
- [c16] 16. The system of claim 15 wherein said analog sensor is selected from a group consisting of load cells, vibration sensors, level sensors, pressure sensors, and humidity sensors.
- [c17] 17. The system of claim 11 further comprising a touch pad interface adapted communicating said acquired data to an external touch pad.
- [c18] 18. The system of claim 17 wherein said touch pad interface is further adapted for receiving touch pad data from a second external touch pad.
- [c19] 19. A method for railcar data acquisition and communication, said method comprising:  
acquiring railcar data from a railcar;  
generating acquired data from said railcar data;  
deriving transmitted data from said acquired data; and  
transmitting said transmitted data.
- [c20] 20. The method of claim 19 wherein said step of transmitting comprises wirelessly transmitting said transmitted data.
- [c21] 21. The method of claim 19 wherein said step of generating comprises converting single-wire data to said acquired data.
- [c22] 22. The method of claim 21 wherein said step of converting comprises converting identification data to said single-wire data.
- [c23] 23. The method of claim 21 wherein said step of converting comprises measuring a temperature of said railcar and converting said temperature to said single-wire data.
- [c24] 24. The method of claim 21 wherein said step of converting comprises:  
counting data pulses to yield a data pulse count;  
converting said data pulse count to said single-wire data; and

generating said data pulses as a function of revolutions of a wheel of said railcar.

- [c25] 25. The method of claim 21 wherein said step of converting comprises converting an analog sensor signal from an analog sensor to said single-wire data.
- [c26] 26. The method of claim 25 wherein said analog sensor is selected from a group consisting of load cells, vibration sensors, level sensors, pressure sensors, and humidity sensors.
- [c27] 27. The method of claim 19 further comprising communicating said acquired data to an external touch pad.
- [c28] 28. The method of claim 27 wherein said step of communicating further comprises receiving touch pad data from a second external touch pad.
- [c29] 29. A method for railcar data acquisition and communication, said method comprising:  
acquiring railcar data from a railcar;  
generating acquired data from said railcar data;  
deriving transmitted data from said acquired data; and  
transmitting said transmitted data,  
said step of transmitting comprising wirelessly transmitting said transmitted data,  
said step of generating comprising converting single-wire data to said acquired data.
- [c30] 30. The method of claim 29 wherein said step of converting comprises converting identification data to said single-wire data.
- [c31] 31. The method of claim 29 wherein said step of converting comprises measuring a temperature of said railcar and converting said temperature to said single-wire data.
- [c32] 32. The method of claim 29 wherein said step of converting comprises:  
counting data pulses to yield a data pulse count;

converting said data pulse count to said single-wire data; and  
generating said data pulses as a function of revolutions of a wheel of said  
railcar.

[c33] 33. The method of claim 29 wherein said step of converting comprises  
converting an analog sensor signal from an analog sensor to said single-wire  
data.

[c34] 34. The method of claim 33 wherein said analog sensor is selected from a  
group consisting of load cells, vibration sensors, level sensors, pressure  
sensors, and humidity sensors.

[c35] 35. The method of claim 29 further comprising communicating said acquired  
data to an external touch pad.

[c36] 36. The method of claim 35 wherein said step of communicating further  
comprises receiving touch pad data from a second external touch pad.